

Avenues to Higher Levels of Psychic Communication and Neurological Referencing: An Outline of Recent Developments in the Fine Arts

John Grayson

PREAMBLE

Much of the material presented here is tight and compact to avoid ambiguity. This is always a possibility when the meaning for existing basic words assumes new values of greater or lesser scope and weight. Rather than reducing much of the material in this paper for casual reading, I have adhered to, at important points, the use of quoted material from each of the artist's published works. I want to emphasize the importance of using and reading the major references given in this paper, since many sentences in the following pages describe the core of a concept rather than its logical evolution. Lastly, I want to emphasize the importance and value of direct and full participatory experience in the artistic process. Do it. I hope this paper will suggest some new ideas – things to try, new games worth playing. Pure cerebral involvement and speculation are never a substitute for direct personal experience.

INTRODUCTION

Artists who work more from a base of self-acquired awareness of their own creative psycho-physical process, as contrasted with those involved in the neurologically based creative life⁴, are currently involved in many exciting, highly significant developments in the fine arts. These developments, having their roots basically in ontological, holistic, and systems approaches promise a plethora of dynamic possibilities and, in particular, promise a rich and profound capability for the non-verbal communication of subtle gradations of feelings and abstract psychic processes through the use of cybernetic tools. This latter area will be the major focus of this paper. I will begin by quoting John Whitney Sr., the granddaddy of present-day visual systems artists. He was one of the first to speak of this type of capability as a real possibility.

AVENUE I

"An unknown world of communication remains to be discovered within that area of visual experience bounded by color and pattern in motion and structured in time as in music. Typography, the unspoken word, can function in new ways within this realm of visual experience. So can the representational image often in its broadest symbolical, non-verbal, syntax. Of course, music and sound in general belong here.

"Music, often called the one truly universal language and looked upon, in some special cases, as exemplary of the highest cultural achievement of Western civilization, stands to be superseded as a communicating force when arts of totally intermeshed image and sound become a part of daily life. Quite naturally, then, the technology of computer graphics demarks the beginning of a new *era* (italics mine) as surely as we are witness to the end of an old.

"We may look forward to media of communication which are in utero today, but which in the future may actually underpin the very structure of technological educational media and art, if there is to be art."9

Presently, we neither know specifically how these media will be manifest nor what their message capacity will be. What we do know, however, is a basic theorem responsible for the conception: the organization is the information. On the technological side, these endeavours largely involve the three areas dealt with in this paper: computer graphics; artificial intelligence; and bio-feedback technology. Various types of bio-psychic explorations as carried out at the Aesthetic Research Centre, Duncan, B.C., parallel the above. They are described briefly toward the end of this paper. All of these areas are quickly becoming amorphous and will soon take on the appearance of a single sphere of activity. I will now describe the three aforementioned areas and briefly trace the currently developing interrelationships between them.

To give you some familiarity with those thoughts and processes which are of immediate concern to artists working in the area of computer graphics, I will quote John Whitney Sr. again; this time, from the recently published book 'Expanded Cinema'10:

"Da Vinci talked about an art of color which would be dealt with as musical tones. Wilfred and Remington in England at the turn of the century were building color organs. They were so hung up with parallels with music that they missed the essence of their medium musical note? It's totally abstract. That's the essential point and that's why I use the musical What is an analogy. The essential problem with my kind of graphics must resemble the creative problem of melody writing. It is perhaps the most highly sensitive task of art, involving as it does balance, contrast, tension, and resolution all brought into play with minimum expenditure. Music really is the art that moves in time. The many statements about architecture being frozen music notwithstanding, here we are truly looking at another art that moves in time. Someone once said about musical compositions: 'Time and tone completely fill each other. what the hearer perceives in the tones and rests of a musical work is not simply time but shaped and organized time... so the conventional formula receives its final interpretation: music is a temporal art because, shaping the stuff of time, it creates an image of time.' I like that idea very much, so I ask myself, what can be essentially the image of time for the eye to perceive?

"Computer graphic systems present an opportunity to realize an art of graphics in motion with potentials that are only now conceivable and have never been explored... I expect to make a lot more progress in the direction of having more and more levels of formal organization. repeat: ...more and more levels of formal organization.

AVENUE II

This last statement of Whitney leads directly to the work of another pioneer.

Composer/Mathematician David Rothenberg during the last decade has been carrying out extensive theoretical and applied research, working toward an inter-meshed audio-visual *language*. This work began when Rothenberg received a government contract to develop some sort of communication format by which a man could establish an exchange of concepts and ideas with an alien species. This immediately led him to carry out a thorough investigation of man's one universal language: music.

In his 1969 paper 'A Pattern-Recognition Model Applied to the Perception of Pitch', he made the following comments about music. "Since the publication of Helmholtz's *Tonempfindungen* 2 1862, many attempts have been made to explain or predict the perception of complex tones. These have derived from speculations about difference and combination tones, beats, and coincidences between harmonies, possible similarities between neural pathways and electronic circuits, and the accidents of cultural conditioning. As yet, none of these has produced a satisfactory model for comprehending complex auditory phenomena.

"Clearly our perception of music is, in large part, learned. That is, 1. a listener must extract from (in effect such parameters must also be determined) and 2. he must code (classify and label) the raw sensory input (i.e. focus his attention on) those data determined by relevant parameters the relevant parameters in a manner suitable for interrogation by means of feedback (checking combining intervals to form motifs, motifs to form phrases, etc.). Thus by the 'coding' of a sensory whether his choice of relevant parameters was correct) and suitable for further processing (e.g. is equivalent in function. Such coding is, of course, different for each musical culture as it is for input is meant the partitioning of the stimuli from that input into classes each of whose elements Since coding places stimuli in equivalence classes, ambiguity is avoided. Also, to the extent that each linguistic culture (i.e., different phonemes are significant in different spoken languages). music is a linguistic system, the efficiency with which the constructed codes can carry relevant information is most important."7

Thus Rothenberg found that good composers (like Mozart) had a very high efficiency in their contained a very low efficiency and was quite redundant in the choice and amount of notes used. music, as contrasted with, say, the composer of 'I Am Dreaming of a White Christmas', which ethnomusicology, and psychophysiology, Rothenberg was able to develop and generate From similar studies, and other extensive investigations into world music systems, inter-active programs which allow a computer to learn the preferences, likes and dislikes, and intuitive style of the operator-artist, i.e., to follow his imagination as he goes through the evolutionary procedure of composing music through a specially designed music-type keyboard device, or as he 'paints' animated abstract sequences on a cathode ray tube (video screen). This latter area merges into the field of computer graphics.

I will not go into the symbolological basis of Rothenberg's software packages except to say that their essential elements consist of atomic predicates (less than, equal to, etc.); connectives (and, or, not, implies, etc.); quantifiers (there exists, for every, etc.); variables; and constants.

The genesis of this system is based in *practicality*: the method of analysis is the same as the method of synthesis. This system is both currently in use and undergoing further development at the composer's lab.

Where this work is leading is described in a more recent paper by Rothenberg:

"In addition to the facilitation of rapid learning, the above interactive techniques are designed so that the system may learn to perform tasks which a human can perform, but which he cannot pro-

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gram because he is unable (by introspection) to determine the principles governing his own performance (consider the recognition of faces or of correct sentences in a language). These interactive techniques should also enable a trainer to assist in teaching the system to perform tasks he himself cannot perform because, in effect, the trainer is learning as the system is, and may utilize his intuition in the training process. That is, the system enables a computer to find features different than those used by the trainer, but nevertheless checks itself by permitting the trainer to 'see' as the computer 'sees'. When such information is not available from the trainer, the system nonetheless may utilize the feedback on the classification it generates. It may be metaphorically stated that the system proceeds, whenever possible, by modelling the trainer's 'ontology' (i.e., the partition of his raw sensory experiences into objects and relations between objects).

"Learning is accomplished by the generation of predicates (computer programs) from primitive (atomic) predicates supplied to the system. These include features introduced by a trainer-artist which, *from* experience or *intuition*, he considers relevant to the task."⁸

A more detailed, yet general description of Rothenberg's adaptive pattern recognition models for aural and visual materials will appear in the A.R.C. publication 'Sound Sculpture' 1. It includes a more extensive description of the visual applications of his work.

AVENUE III

Recent advances in bio-feedback technology indicate that through bio-feedback training man can learn to control willfully his body and his state of consciousness to a degree that traditionally has been dismissed in Western cultures. Projects around the world are demonstrating that it is possible to learn personal control over the functions of our mental states and/or our visceral organs (the heart, liver, kidneys, intestines, glands, blood vessels) in the same specific way we learn, for instance, to play a Mozart Sonata.

Of the many types and gradations of identifiable brain-wave patterns which can be associated with certain feeling states, there is one which is currently receiving much attention: the alpha wave state. It is the easiest to detect and has a range between 8 to 13 cycles per second.

It has been noted by numerous scientists and researchers that musicians, athletes and artists (ie, individuals who are involved in a stringent discipline) are among those who are especially adept at control over their brain waves. Composer LaMonte Young, who keeps a 120-cycle 'home' tone going

in his New York studio at all times, had no trouble generating alpha the first time he ever tried it, because his mind "is tuned to frequencies and intervals".

Dr. Kamiya, in the book 'Altered States of Consciousness', tells of finding that those individuals who easily produce alpha frequently use words like *images*, *dreams*, *wants*, and *feelings* in their conversation.² Also, "psychotherapists, of the type who lay great store by such techniques as sensitivity training and the other sorts of growth techniques seem to be good at learning alpha control. People who look you in the eye and feel at ease in close interpersonal relationships, who are good at intuitively sensing the way you feel, are also good at this."³

Preparation for execution of some complex performance or of the 'mental set' often required before beginning a performance seems also associated with alpha presence. The moment that every good musician or athlete takes to prepare his 'set' just before beginning to perform is such a case ⁵

It is important to keep in mind that descriptions of how one learns to control a certain brain-wave state are very difficult to relate. For the most part, there are no verbal referents by which to describe the kind of learning which takes place during bio-feedback training. We are suddenly

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faced with the limitations of our generative and descriptive semantics when we deal primarily with perceptions. This is where Rothenberg's pattern recognition models will eventually play an important role. For it is practice *the results of which are known* that makes perfect. ⁶

The new manifestations of art-science will be in participation in the perceptual process itself. ⁶

SUMMATION

We enter a more global and direct conception of art. Art, in its highest form, may soon cease to exist as a material medium.

Such endeavours involve extensive understandings of the perceptual process as well as deeper appreciations of the values of the primitive and childlike, the dream, the immediate emotional response, bio-psychic processes, and so on.

Currently, the view held by many is that one of the great cultural projects of the next few generations is to produce a synthesis between the sciences (including our oldest science: music) and such other modes of consciousness as intuition, mystical tradition, bio-energy, etc. This is so, but I believe it goes beyond this.

All activity such as that described or implied in this paper, which in its real, actual, and true form is always a kind of gut-level activity/learning experience, is developing many points of integration and synthesis, and will eventually, I believe, become a powerful form of Western 'yoga' (or whatever name it acquires.)

Emphasis on this type of growth and awareness-enlarging experience (what all Yogas are) places emphasis, naturally, on those areas the Westerner is least capable of doing in consciousness and

that is *feeling*. In this type of gut-learning experience the word 'feeling' takes on a very deep and somewhat non-verbal meaning to the Individual. Frequently an individual 'studying' this type of developing Yoga experiences extensive increases in memory retention and recall permanent, more efficient physiological changes such as a lowering of the voice and increase in resonance, relaxing of body musculature, etc. Such attainments are not easily come by, though — they require *commitment* to the process of deep growth and learning — a discipline which touches on every aspect of the individual's total organism.

Research in this area, this moving toward and exploring ways of synthesis between various existing and developing disciplines is, in terms of further possibilities, only just beginning.

John Grayson
Aesthetic Research Centre
Duncan, B.C.
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